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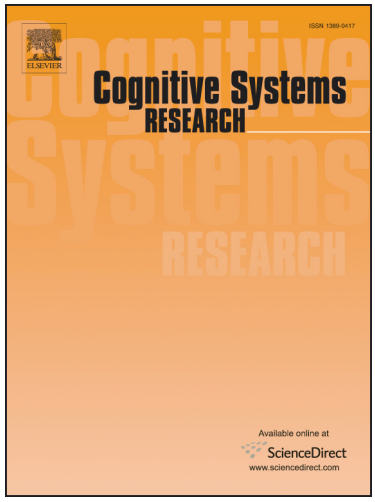

A causal foundation for consciousness in biological and artificial agents

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ACCEPTED MANUSCRIPT

A causal foundation for consciousness in biological and artificial agents

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Abstract. *Traditional approaches to consciousness model consciousness as the outcome either of internal computational processes or of cognitive structures. We consider an alternative hypothesis – consciousness is the hallmark of a fundamental way to organize the causal interaction between an agent and its environment. Thus consciousness is not a special property or an addition to the cognitive processes, but rather the way in which the causal structure of an agent is causally entangled with a world of actual causes. The advantage of this hypothesis is that it suggests how to exploit this kind of causal coupling to envisage a few tentative guidelines for conscious artificial agents. In this paper, we outline the basic proposal as to the characteristics of these causal building blocks and then we consider a set of standard technologies that may take advantage of such an approach. Consciousness is outlined as a kind of cognitive middle ground and experience is not an internal by-product of cognitive processes but the external world that is carved out by means of causal interaction. Thus, consciousness is not the penthouse on top of a 50 stores cognitive skyscraper, but the way in which the steel girders snap together from bottom to top.*

Keywords: machine consciousness; consciousness; cognitive architecture; externalism; situated cognition

1 Introduction

Is it possible to devise a general architectural principle that might lead an artificial agent to exploit what is called consciousness in human beings and various animals? In principle, there is no reason why such a feat should not be accomplished – at least, if consciousness is a natural feature of certain biological beings as we believe it to be. However, we are not sure what consciousness is and what are the necessary and sufficient conditions for its occurrence. Yet, consciousness appears to be a universal feature of all biological agents above a certain level of cognitive development. This is neither a sure proof that consciousness is a mandatory

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